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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,845	01/05/2004	Sung-Chul Kang	YOM-0205	3873

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EXAMINER	
CHU, JOHN S Y	
ART UNIT	**PAPER NUMBER**
1752	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/750,845	KANG ET AL.	
	Examiner	Art Unit	
	John S. Chu	1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-14 and 16-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *21* is/are allowed.

6)☒ Claim(s) *11-14 and 16-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Office action is in response to the RCE filed September 27, 2006.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 11-14, and 16-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims to the method lack recited method steps so in essence it is a recited method in the preamble with an intended use to apply the composition to a substrate. The claim is indefinite without any active, positive steps delimiting how this use is actually practiced.

Correction is necessary.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 11-14 and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over JEFFRIES, III et al (5,346,799) or EBERSOLE (5,324,620) in view of KODAMA et al (5,853,949) SHERIFF et al (6,117,610) and GRACIA et al (6,232,031 B1).

The claimed invention has been recited hereafter:

11. (Currently Amended) A method for applying a photoresist composition to a large-scale substrate by an MMN head coater, wherein the photoresist composition comprises:

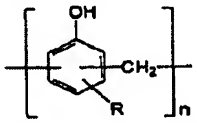
(a) 5 wt% to 30 wt% of a polymer resin represented by the following Chemical Formula 1;

(b) 2 wt% to 10 wt% of a diazide photoactive compound;

(c) 50 wt% to 90 wt% of an organic solvent; and

(d) 500 to 4000 ppm of a Si based surfactant:

Chemical Formula 1



wherein R is C_1 to C_4 alkyl, and n is an integer of 15 to 10,000, and wherein the Si-based surfactant is a polyoxyalkylene dimethylpolysiloxane copolymer compound.

wherein the composition and content of solvent and surfactant is controlled to prevent stains and improve coating characteristics in a photoresist film formed on the substrate from the photoresist composition, and

wherein stains include central stains, lateral stains, or cloudy stains.

and is included by reference wherein claim 6 is further drawn to the addition of a crosslinking agent is shown below:

16. (withdrawn) The method of Claim 11,

wherein the composition further comprises one or more nitrogen-containing crosslinking agents selected from the group consisting of a condensation product of urea and formaldehyde, a condensation product of melamine and formaldehyde, a methylol urea alkyl aldehyde condensate, a methylol urea alkylether, and a methylol melamine alkylether.

Each of JEFFRIES, III et al, or EBERSOLE recite a photoresist composition comprising a S-based surfactant in a composition comprising a novolak resin and a quinonediazide compound. Said references fail to teach the use of a crosslinking agent in the photoresist composition as currently recited in claim 6.

KODAMA et al '949 discloses a positive photoresist composition comprising a novolak resin and a quinonediazide compound with the addition of a polyphenol compound, see column

6, lines 32 – column 7, line 60 for the alkali-soluble resin and photosensitive compound. Applicants are directed to column 11, lines 46-51 wherein KODAMA et al teaches the use of surfactants being Si-based. In fact the same surfactants as disclosed in JEFFRIES, III et al and EBERSOLE are disclosed here in KODAMA et al, see the surfactant trade name of FLORAD FC-430 in column 11, line 46.

The primary disclosure which the examiner relies on is found in column 12, lines 40-56 wherein KODAMA et al discloses the suitable use of crosslinking agents which serve to improve the dry etching resistance, improve sensitivity and heat resistance, yet not alter the positive working property of the photoresist composition. Specific crosslinking agents include melamine-formaldehyde and others like benzoguanamine and glycouril-formaldehyde. Thus the skilled artisan is motivated to use such components to improve the photoresist image that is formed.

Each of SHERIFF et al and GRACIA et al are cited of interest with respect to the use of polyether modified dimethylpolysiloxane copolymer surfactants. The Examples 3-6 in SHERIFF et al disclose the following attached:

EXAMPLES 3–6

Four imaging compositions and plates of the present invention were prepared using the following components:

COMPONENT	Example 3 (grams)	Example 4 (grams)	Example 5 (grams)	Example 6 (grams)
Cresol-formaldehyde novolac resin	4.620	4.620	4.620	4.620
2,4-Bis(2-diazo-1,2-dihydro-1-oxo-5-naphthalenesulfonyloxy) benzo-phenone	1.154	1.154	1.154	1.154
Carbon black	0.108	0.217	0.434	0.868
1-Methoxy-2-propanol solvent	88.118	88.009	87.792	87.358
Acetone	5.881	5.881	5.881	5.881
CG-21-1005	0.108	0.108	0.108	0.108
BYK-307	0.011	0.011	0.011	0.011

CG 21-1005 is a dye available from Ciba-Geigy.
BYK-307 is a polyether-modified polydimethylsiloxane available from BYK-Chemie.

wherein BYK-307 is a surfactant as claimed in claim 11.

GRACIA et al likewise discloses the use of BYK 344 surfactant in Examples 1-4 in a composition with a quinone diazide compound and a novolak resin. Here the use of a polyoxyalkylene dimethylpolysiloxane copolymer surfactant is taught in a composition for photolithographic compositions comprising a diazide compound a phenol novolak resin and a solvent. BYK 333 and BYK 344 are attached with their product descriptions from the BYK-Chemie product list.

It would have been *prima facie* obvious to one of ordinary skill in the art of positive photoresist compositions to add a crosslinking agent, such as melamine-formaldehyde into the photoresist composition of JEFFRIES, III et al or EBERSOLE as an agent to improve dry etching resistance, and heat resistance and reasonably expect same or similar results as disclosed

in JEFFRIES, III et al or EBERSOLE for high thermal resistance and low scumming upon development.

It also would have been *prima facie* obvious to one of ordinary skill in the art of photolithographic compositions and coating methods to add the known surfactants as disclosed in SHERIFF et al and GRACIA et al into the compositions of JEFFRIES, III et al, EBERSOLE and reasonably expect same or similar results with respect to having compositions with high thermal resistance.

The argument by applicant have been carefully considered, however it is believed that a prima facie case of obviousness is present wherein each of the components are disclosed to be known and one of ordinary skill in the art would be directed to use the crosslinking agent and the surfactants as disclosed above. The examiner notes that method claim of claim 11 is indefinite as a method wherein the steps are lacking, thus the claim is seen as an intended use claim of a known or obvious composition. The rejection is repeated.

5. Claim 21 is allowed.

The recited method claim in claim 21 is seen as a proper method wherein the composition is processed by applying to a substrate with the MMN head coater by spray-dispense coating and spinning.

The coating process using the MMN head coater is not disclosed in any of the prior art references of record and the claim is seen as allowable over the prior art of record.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. DARAKTCHIEV is cited to disclose a process for coating a photoresist composition by atomized spray coating.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Chu whose telephone number is (571) 272-1329. The examiner can normally be reached on Monday - Friday from 9:30 am to 6:00 pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Cynthia Kelly, can be reached on (571) 272-1526

The fax phone number for the USPTO is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PMR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

John S. Chu
Primary Examiner, Group 1700

J.Chu
April 13, 2007